1997-98 KIRIS ASSESSMENT
Open-Response Item Scoring Worksheet

Grade 4—Science Question 10

The **academic expectations** addressed by "Plant Characteristics" (Question 10) include

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.

The **core content** assessed by this item includes

Content

- The Characteristics of Organisms – Living organisms are classified into groups by using various features.

Inquiry

- Scientists develop explanations using observations (evidence) and what they already know about the world. Reasonable explanations are based on evidence from investigations.

Plant Characteristics

Think of two kinds of plants that are VERY DIFFERENT.

a. Name and describe each of the plants. Also tell where you would find each of them growing in nature.

b. Tell what is the SAME and what is DIFFERENT about the plants.

SCORING GUIDE
Grade 4 Science

Score	Description
4	The response is complete and shows a strong understanding of features used to describe plants and of how to tell where the plants would be found in nature. Two different plants are named and described, and where they grow is clearly identified. One similarity and one difference is identified.
3	The response shows an understanding of features used to indentify plants and of how to tell where they would be found in nature. Two different plants are named and described and where each would be found is listed. The response identifies a similarity or difference. The response contains only minor errors, misconceptions, or omissions.
2	The response shows a limited understanding of features used to describe plants and of how to tell where the plants would be found in nature. There is a description of two different plants and there may be an identification of where they would live, and similarities and differences; however, the response may contain errors, misconceptions, or omissions.
1	The response is incomplete and shows a minimal understanding of features used to describe plants and of how to tell where the plants would be found in nature. There is an attempt to describe a plant, where it is found in nature or to identify similarities or differences; however, the response may contain major errors, misconceptions, and/or omissions.
0	Response is totally incorrect or irrelevant.
Blank	No response.

Sample Student Responses

a. Plants: roses in gardens; Venus Fly Trap in bogs; dandelions in fields.

b. Common similarities: have leaves and/or flowers; need sunlight and water.

Common differences: height of plant; leaf shape; type of flower; obtaining nutrients (in reference to the Venus Fly Trap).

Science Behind the Question

A variety of plants will be chosen on the basis of differences such as size, leaf form, growing habits, etc. Best descriptions will include all of the major differences in the plants rather than single or most obvious differences. Habitat, including special needs of the plants, will be included. Sameness will include such features as green color (for most plants, but not all); roots; stems; need for water, carbon dioxide, and nutrients. Allow for exceptions and differences such as the duckweed plant has no stem, Spanish moss has no roots, etc.

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 4-Point Response of Student Work

Student Response

I'm going to tell you about two plants that are different. Then I have to name and describe each of the plants and tell where you would find them. Then tell what is the same and what is different about the plants.

Here are the two different plants and where they live. The first is the cactus. The second is the rose. The cactus lives in the desert. The rose lives in the temperate forest. Those are the different plants and where the live.

Here are some things that are the same about the cactus and the rose. They both have a sharp, pointy needle thing. Then all year around they need water. The last thing I can think of is that they use photosynthesis. That's things that are the same about them.

Now here are some things that are different about a cactus and a rose. A cactus's pointy needle is longer and skinnier than a rose's. A rose is shorter than a cactus. The last I can think of is that a cactus doesn't have leaves. That's somethig different about a cactus and a rose.

I have told where a cactus lives and where a rose lives. Then I told what is different and the same about each. So I'll put my pencil up now.

← Student names two very different plants and clearly identifies where they would likely be found in nature (i.e., "the desert," "the temperate forest").

← Student describes some relevant similarities between the two plants (e.g., "They both have a sharp, pointy needle thing," "they use photosynthesis").

← Student describes several relevant differences between the two plants (i.e., student contrasts the shape of the plants' spiny features, the height of the plants, and the existence of leaves as a feature). Embedded within the differences is some description of how each plant looks.

Overall, student shows a strong understanding of features used to describe plants and of how to tell where the plants would be found in nature. While the description of each plant could have been clearer, at this grade level this overall response is a strong one.

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 3-Point Response of Student Work

Student Response

Two very differant plants are probley Dogwood and a thorn bush. Dog woods are very slinder trees. They have fully green leaves and beautiful flowers that can be pink or white. They bloom their green leaves and beautiful flowers in the spring. Thorn bushes do not have leaves. They are not very colorful. They may stick you witch hurts a lot. They may be thick or thin. The thicker they are the more it hurts when they stick you. You may find Dogwood growing in a peaceful neiberhood. You can plant a Dogwood in your yard. You may find thorns somewhere in the woods or in the country. Just watch out where you step in the woods!

The similarity and diffrences between Dogwood and thorns. A similarity between them is that they are both plants. A diffrence is a thorn will cut or hurt you very deepley and a Dogwood can do no harm.

← Student names two different plants: dogwood (a specific plant) and thorn bush (a generic plant).

← Student describes each of the two plants. The description of the dogwood is more complete and accurate than that of the thorn bush.

← Student describes where each plant grows. Description of the dogwood's habitat (i.e., "a peaceful neiberhood") is limited.

← Student's provides a limited description of a similarity and a difference between the two plants. The described difference is more related to effects on people than to plant characteristics. This is acceptable at this grade level.

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 2-Point Response of Student Work

Student Response

a. Sunflower and Cactus

The sunflower has seeds, leaves, roots and a stem. A catus has needles and roots. You find a sunflower in someones yard. You would find a cactus in the desert. The same about a sunflower and a cactus is the both have roots and they're both plants. Things that are different is that one has seeds and leaves the other has needles.

Student provides a limited description of each plant. →

Student identifies some basic similarities and one difference. The difference incorrectly implies that cacti do not produce seeds. →

← Student identifies two different plants.

← Student tells where each plant grows. The habitat of the cactus is described more accurately than that of the sunflower.

Sample 1-Point Response of Student Work

Student Response

The two plants are a Rose and a Bean Plant.

What are alike	Whats differnt
They are both plants	one's a flower
They both have roots	one is red
They both have a green stem.	one grows differnt
They both have leafs	

← Student identifies two different plants.

← Student lists some similarities and differences. The differences are vague or incorrect.

Student does not provide individual descriptions of the plants or tell where each plant grows.

INSTRUCTIONAL STRATEGIES
Grade 4 Science

The open-response item "Plant Characteristics" was designed to assess the students' understanding that (1) plants have different names and different characteristics, (2) plants have different habitats, and (3) plants have some characteristics that are the same and others that are different. The instructional strategies below present ideas for helping students explore and master these concepts.

Discuss the following concepts:

- Plants have specific features (e.g., roots, stems, leaves, flowers) that distinguish them from other organisms.
- The specific features of a plant have specific functions (e.g., roots take in nutrients from the earth).
- Plants that grow in different places may look different because they must survive in different climatic conditions.
- A plant's needs help determine the shape and look of the plant's features.
- Although plants may look different, they need the same things to survive: sunlight, water, carbon dioxide, a place to anchor, a favorable temperature.

Have students work individually, in pairs, and/or in small groups to complete any or all of the following activities:

- Observe some radish or bean seedlings and then draw and label the seedlings' parts. Use a magnifying glass to include as much detail as possible in the drawing. In pairs, write what they think each part of the plant does based on the way it looks. Discuss in small groups or as a whole class the functions of the parts. Finally, write a poem that describes the plant, names its parts, and tells what each part does.
- Grow one type of plant under different conditions (e.g., vary the light, water, or temperature) and observe the effects on each plant's growth. Discuss how plants can look different under different conditions.
- Observe stations (set up by the teacher) with pictures of plants that live in different areas such as in a desert, in the mountains, by a river, and in a grassland. If possible, observe samples of plants in addition to the pictures or other artifacts. Work in teams at each station and discuss the availability of light, water, carbon dioxide, and temperature in each area. Look carefully at the plants/pictures and list anything special about the plant that would help it survive in the conditions of the area. Discuss as a whole class how these areas are different, how the plants are different, and how they are the same.